PHILIPS

QB 3.5/750

TETRODE for use as H.F. amplifier and oscillator
TETRODE pour utilisation en amplificatrice H.F. et en oscillatrice
TETRODE zur Verwendung als HF-Verstärker und Oszillator

Cooling : radiation/low velocity air flow
Refroidissement: radiation/léger courant d'air
Kühlung : Strahlung/schwacher Luftstrom

Filament : thoriated tungsten
Filament : tungstène thorié
Heizfaden: thoriertes Wolfram

Heating : direct
Chauffage: direct
Heizung : direkt

V_f = 5 V
I_f = 14,1 A

Capacitances
Capacités
Kapazitäten

C_a = 4,5 pF
C_{g1} = 12,7 pF
C_{ag1} = 0,12 pF

Typical characteristics
Caractéristiques types
Kenndaten

μ_{g2g1} = 5,1
S (I_a=100 mA) = 4 mA/V

λ	Freq.	C telegr.		B teleph.		C_{ag2}·mod.		B_{mod} [1]	
m	Mc/s	V_a (V)	W_o (W)	V_a (V)	W_o (W)	V_a (V)	W_o (W)	V_a (V)	W_o (W)
>4	<75	4000	1000	4000	126	3000	510	3000	1240
		3000	800	3000	125	2500	375	2500	1140
		2500	575	2500	125			2000	974
2,5	120	2500	500					1500	660

[1]) Two tubes; deux tubes; zwei Röhren

Temperatures and cooling
Températures et refroidissement
Temperaturen und Kühlung

Temperature of anode seal
Température du scellement de l'anode = max. 220 °C
Temperatur der Anodeneinschmelzung

Temperature of pin seals
Température des scellements des broches = max. 180 °C
Temperatur der Stifteneinschmelzungen

Bulb temperature
Température de l'ampoule = max. 350 °C
Kolbentemperatur

In order to keep the temperatures below the maximum permitted values a low velocity air flow has to be directed onto the anode seal and the bottom of the envelope.

In order to prevent overheating of the screen-grid pins by high-frequency current it is recommended to include both screen-grid socket connections in the circuit.

Afin de maintenir les températures au-dessous des valeurs maximum admissible, il sera nécessaire de diriger un léger courant d'air vers le scellement de l'anode et vers le fond de l'ampoule.

Il est recommandé d'incorporer les deux bornes de raccordement de la grille-écran dans le circuit pour éviter le surchauffage des broches de la grille-écran par le courant haute fréquence.

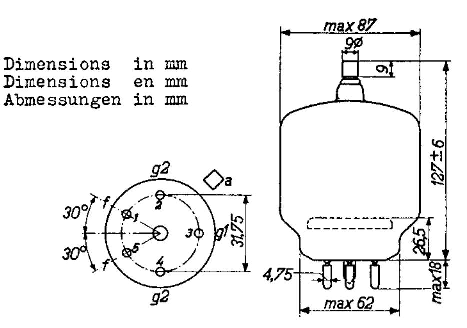
Damit die Temperaturen unterhalb der höchstzulässigen Werte bleiben, soll ein schwacher Luftstrom auf die Anodeneinschmelzung und auf den Boden des Kolbens gerichtet werden.

Es empfiehlt sich, zur Vermeidung einer Überhitzung der Schirmgitterstifte vom Hochfrequenzstrom, beide Anschlussklemmen an der Schaltung zu beteiligen.

Net weight
Poids net 185 g
Nettogewicht

Shipping weight
Poids brut 910 g
Bruttogewicht

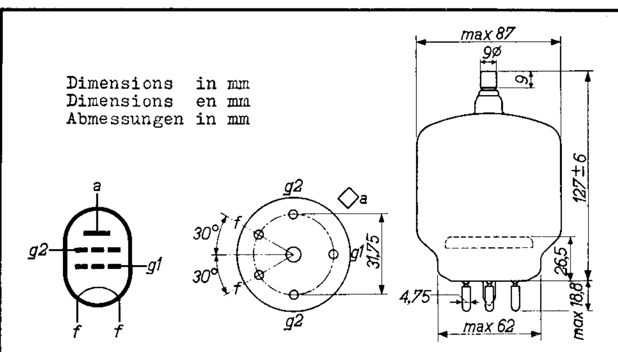
Dimensions in mm
Dimensions en mm
Abmessungen in mm



Base, culot, Sockel: GIANT 5-PIN.

Socket Support Fassung	40211/01
Clip Borne de connexion Anschlussklemme	40624

Mounting position: vertical with base up or down
Montage : vertical avec le culot en haut ou en bas
Einbau : senkrecht mit dem Sockel oben oder unten



Base, culot, Sockel: GIANT 5-PIN.

Socket Support Fassung	40211/01
Clip Borne de connexion Anschlussklemme	40624

Mounting position: vertical with base up or down
Montage : vertical avec le culot en haut ou en bas
Einbau : senkrecht mit dem Sockel oben oder unten

PHILIPS

H.F. class C telegraphy
H.F. classe C télégraphie
HF – Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

f	= max.	75 Mc/s		
V_a	= max.	4000 V	f = max.	100 Mc/s
W_{ia}	= max.	1250 W	V_a = max.	3300 V
W_a	= max.	250 W	W_{ia} = max.	1000 W
I_a	= max.	350 mA		
V_{g2}	= max.	600 V		
W_{g2}	= max.	35 W	f = max.	120 Mc/s
$-V_{g1}$	= max.	500 V	V_a = max.	2500 V
I_{g1}	= max.	20 mA	W_{ia} = max.	750 W

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

f	=	75	75	75 Mc/s
V_a	=	4000	3000	2500 V
V_{g2}	=	500	500	500 V
V_{g1}	=	-225	-180	-150 V
I_a	=	312	345	300 mA
I_{g2}	=	45	60	60 mA
I_{g1}	=	9	10	9 mA
V_{g1_p}	=	303	265	220 V
W_{ig1}	=	2,5	2,4	1,8 W
W_{g2}	=	22,5	30	30 W
W_{ia}	=	1248	1035	750 W
W_a	=	248	235	175 W
W_o	=	1000	800	575 W
η	=	80	77	77 %

QB 3.5/750

PHILIPS

H.F. class C telegraphy
H.F. classe C télégraphie
HF - Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

f	= max. 75 Mc/s					
V_a	= max.	4000 V		f	= max.	100 Mc/s
W_{ia}	= max.	1250 W		V_a	= max.	3300 V
W_a	= max.	250 W		W_{ia}	= max.	1000 W
I_a	= max.	350 mA				
V_{g2}	= max.	600 V				
W_{g2}	= max.	35 W		f	= max.	120 Mc/s
$-V_{g1}$	= max.	500 V		V_a	= max.	2500 V
I_{g1}	= max.	20 mA		W_{ia}	= max.	750 W

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

f	=	75	75	75	Mc/s
V_a	=	4000	3000	2500	V
V_{g2}	=	500	500	500	V
V_{g1}	=	-225	-180	-150	V
I_a	=	312	345	300	mA
I_{g2}	=	45	60	60	mA
I_{g1}	=	9	10	9	mA
V_{g1_p}	=	303	265	220	V
W_{ig1}	=	2,5	2,4	1,8	W
W_{g2}	=	22,5	30	30	W
W_{ia}	=	1248	1035	750	W
W_a	=	248	235	175	W
W_o	=	1000	800	575	W
η	=	80	77	77	%

H.F. class B telephony
H.F. classe B téléphonie
HF Klasse B Telephonie

Limiting values
Caractéristiques limites
Grenzdaten

f = max. 75 Mc/s			f = max. 100 Mc/s		
V_a	= max.	4000 V	V_a	= max.	3300 V
W_{ia}	= max.	400 W	W_{ia}	= max.	320 W
W_a	= max.	250 W			
I_a	= max.	250 mA	**f = max. 120 Mc/s**		
V_{g2}	= max.	600 V	V_a	= max.	2500 V
W_{g2}	= max.	23 W	W_{ia}	= max.	240 W

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

f	=	75	75	75	Mc/s
V_a	=	4000	3000	2500	V
V_{g2}	=	500	500	500	V
V_{g1}	=	-100	-90	-84	V
I_a	=	94	125	150	mA
I_{g2}	=	0	0	0	mA
V_{g1_p}	=	55,5	61	66	V
W_{ia}	=	376	375	375	W
W_a	=	250	250	250	W
W_o	=	126	125	125	W
η	=	33,5	33	33	%
m	=	100	100	100	%
I_{g1}	=	0,5	2	5,5	mA
W_{ig1}	=	0,06	0,25	0,75	W
W_{g2}	=	4	3,8	6	W

H.F. class C anode and screen grid modulation
H.F. classe C modulation d'anode et de grille-écran
HF Klasse C Anoden- und Schirmgittermodulation

Limiting values
Caractéristiques limites
Grenzdaten

f	= max. 75 Mc/s			f	= max.	100 Mc/s
V_a	= max.	3200 V		V_a	= max.	2600 V
W_{ia}	= max.	825 W		W_{ia}	= max.	660 W
W_a	= max.	165 W				
I_a	= max.	275 mA				
V_{g2}	= max.	600 V				
W_{g2}	= max.	35 W		f	= max.	120 Mc/s
$-V_{g1}$	= max.	500 V		V_a	= max.	2000 V
I_{g1}	= max.	20 mA		W_{ia}	= max.	500 W

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

f	=	75	75	Mc/s
V_a	=	3000	2500	V
V_{g2}	=	400	400	V
V_{g1}	=	-310	-200	V
I_a	=	225	200	mA
I_{g2}	=	30	30	mA
I_{g1}	=	9	9	mA
V_{g1_p}	=	400	280	V
W_{ig1}	=	3,3	2,3	W
W_{g2}	=	12	12	W
W_{ia}	=	675	500	W
W_a	=	165	125	W
W_o	=	510	375	W
η	=	75,5	75	%
m	=	100	100	%
V_{g2_p}	=	350	350	V
W_{mod}	=	344	256	W

[1]) V_{g2} = max. 1000 V, when the temperature of the pin seals is max. 120 °C
V_{g2} = max. 1000 V, si la température des scellements des broches est de 120°C aux max.
V_{g2} = max. 1000 V, wenn die Temperatur der Stiftendurchführungen max. 120°C ist.

H.F. class B amplifier, single side band
Amplificatrice H.F. classe B à une bande latérale
HF Einseitenbandverstärker, Klasse B

Limiting values
Caractéristiques limites
Grenzdaten

f = max. 30 Mc/s
V_a = max. 4 kV
I_a = max. 350 mA
W_{ia} = max. 1250 W

W_{ap} = max. 275 W [1])
W_a = max. 250 W
T_{av} = max. 5 sec
V_{g2} = max. 600 V
W_{g2} = max. 35 W
R_{g1} = max. 250 kΩ

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

f	=	30		30		Mc/s
V_a	=	4		3,5		kV
V_{g1}	=	-105		-110		V
V_{g2}	=	550		600		V
V_{g1p}	=	0	105	0	110	V
I_a	=	50	182	50	207	mA
I_{g1}	=	0	0	0	0	mA
I_{g2}	=	0	9	0	12	mA
W_{ig1}	=	0	0	0	0	W
W_{g2}	=	0	5	0	7,2	W
W_{ia}	=	200	730	175	725	W
W_a	=	200	220	175	235	W
W_o	=	-	510	-	490	W
η	=	-	69	-	67	%

f	=	30		30		30		30		Mc/s
V_a	=	4		3,5		3		2,5		kV
V_{g1}	=	-105		-98		-94		-91		V
V_{g2}	=	500		500		500		500		V
V_{g1p}	=	0	105	0	98	0	94	0	91	V
I_a	=	50	164	50	164	50	164	50	164	mA
I_{g1}	=	0	0	0	0	0	0	0	0	mA
I_{g2}	=	0	8	0	9	0	10	0	10,5	mA
W_{ig1}	=	0	0	0	0	0	0	0	0	W
W_{g2}	=	0	4	0	4,5	0	5	0	5,3	W
W_{ia}	=	200	660	175	575	150	490	125	410	W
W_a	=	200	200	175	175	150	157	125	140	W
W_o	=	-	460	-	400	-	333	-	270	W
η	=	-	70	-	69	-	68	-	66	%

1) Max. value during a modulation cycle
Valeur max. pendant un cycle de modulation
Max. Wert während eines Modulationszyklus

PHILIPS

L.F. class B amplifier and modulator. $I_{g1} > 0$
Amplificatrice et modulatrice B.F. classe B. $I_{g1} > 0$
NF-Verstärker und Modulator Klasse B. $I_{g1} > 0$

Limiting values. See page 9
Caractéristiques limites. Voir page 9
Grenzdaten. Siehe Seite 9

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

V_a	=	3000		2500		V
V_{g2}	=	300		300		V
V_{g1}	=	-55		-51		V
R_{aa}	=	14		9,2		kΩ
V_{g1g1_p}	=	0	280	0	306	V
I_a	=	2x50	2x275	2x50	2x312	mA
I_{g2}	=	0	2x34,5	0	2x44	mA
I_{g1}	=	0	2x15	0	2x21	mA
W_{ig1}	=	0	2x1,9	0	2x2,9	W
W_{g2}	=	0	2x10,5	0	2x13	W
W_{ia}	=	2x150	2x825	2x125	2x780	W
W_a	=	2x150	2x205	2x125	2x210	W
W_o	=	0	1240	0	1140	W
d_{tot}	=	-	5	-	5	%
η	=	-	75	-	73	%

V_a	=	2000		1500		V
V_{g2}	=	300		300		V
V_{g1}	=	-49		-45		V
R_{aa}	=	6,6		4,55		kΩ
V_{g1g1_p}	=	0	328	0	323	V
I_a	=	2x50	2x347	2x50	2x347	mA
I_{g2}	=	0	2x55	0	2x58	mA
I_{g1}	=	0	2x27	0	2x28	mA
W_{ig1}	=	0	2x4	0	2x4	W
W_{g2}	=	0	2x16,5	0	2x17,5	W
W_{ia}	=	2x100	2x694	2x75	2x520	W
W_a	=	2x100	2x207	2x75	2x190	W
W_o	=	0	974	0	660	W
d_{tot}	=	-	5	-	5	%
η	=	-	70	-	63,5	%

L.F. class B amplifier and modulator. $I_{g1} = 0$
Amplificatrice et modulatrice B.F. classe B. $I_{g1} = 0$
NF-Verstärker und Modulator Klasse B. $I_{g1} = 0$

Limiting values
Caractéristiques limites
Grenzdaten

V_a	= max.	4000 V
W_a	= max.	250 W
I_a	= max.	350 mA
V_{g2}	= max.	600 V [1])
W_{g2}	= max.	35 W
$-V_{g1}$	= max.	500 V
I_{g1}	= max.	30 mA
R_{g1}	= max.	250 kΩ

Operating conditions, two tubes
Caractéristiques d'utilisation, deux tubes
Betriebsdaten, zwei Röhren

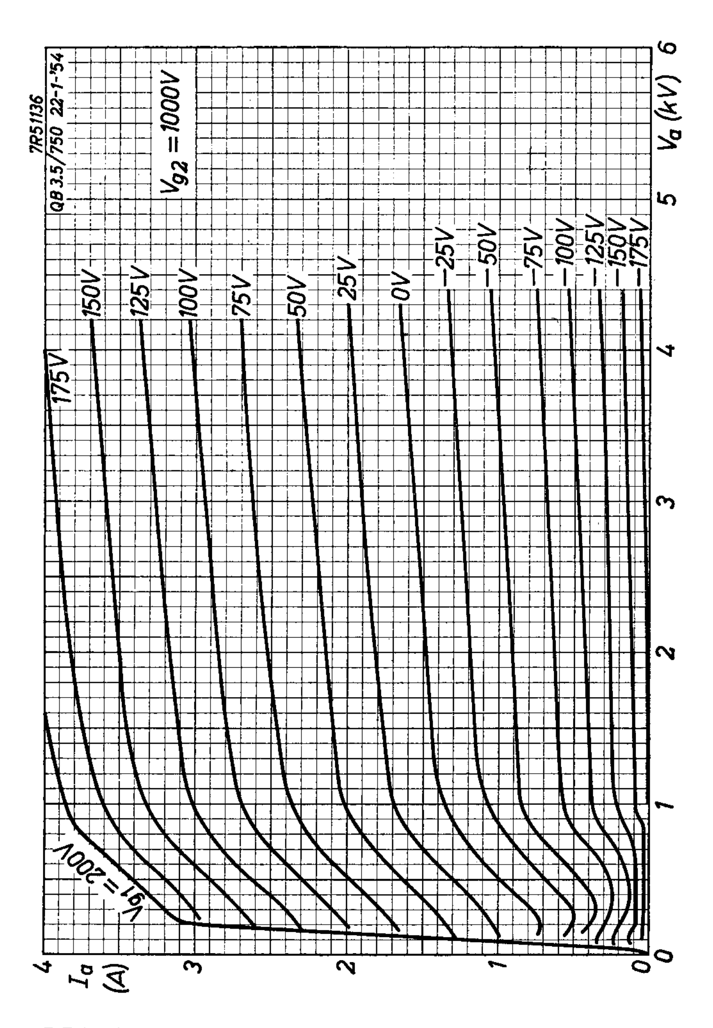
V_a	=	3000		2500		V
V_{g2}	=	500		500		V
V_{g1}	=	-94		-91		V
R_{aa}	=	22		18		kΩ
V_{g1g1p}	=	0	184	0	178	V
I_a	=	2x50	2x155	2x50	2x155	mA
I_{g2}	=	0	2x10	0	2x10,5	mA
W_{g2}	=	0	2x5	0	2x5,3	W
W_{ia}	=	2x150	2x465	2x125	2x387	W
W_a	=	2x150	2x147	2x125	2x132	W
W_o	=	0	635	0	510	W
d_{tot}	=	-	2,8	-	2,6	%
η	=	-	68	-	66	%

V_a	=	2000		1500		V
V_{g2}	=	500		500		V
V_{g1}	=	-88		-85		V
R_{aa}	=	14,5		10		kΩ
V_{g1g1p}	=	0	173	0	167	V
I_a	=	2x50	2x150	2x50	2x150	mA
I_{g2}	=	0	2x14,5	0	2x15,5	mA
W_{g2}	=	0	2x7,3	0	2x7,8	W
W_{ia}	=	2x100	2x300	2x75	2x225	W
W_a	=	2x100	2x105	2x75	2x91	W
W_o	=	0	390	0	268	W
d_{tot}	=	-	3,2	-	3	%
η	=	-	65	-	60	%

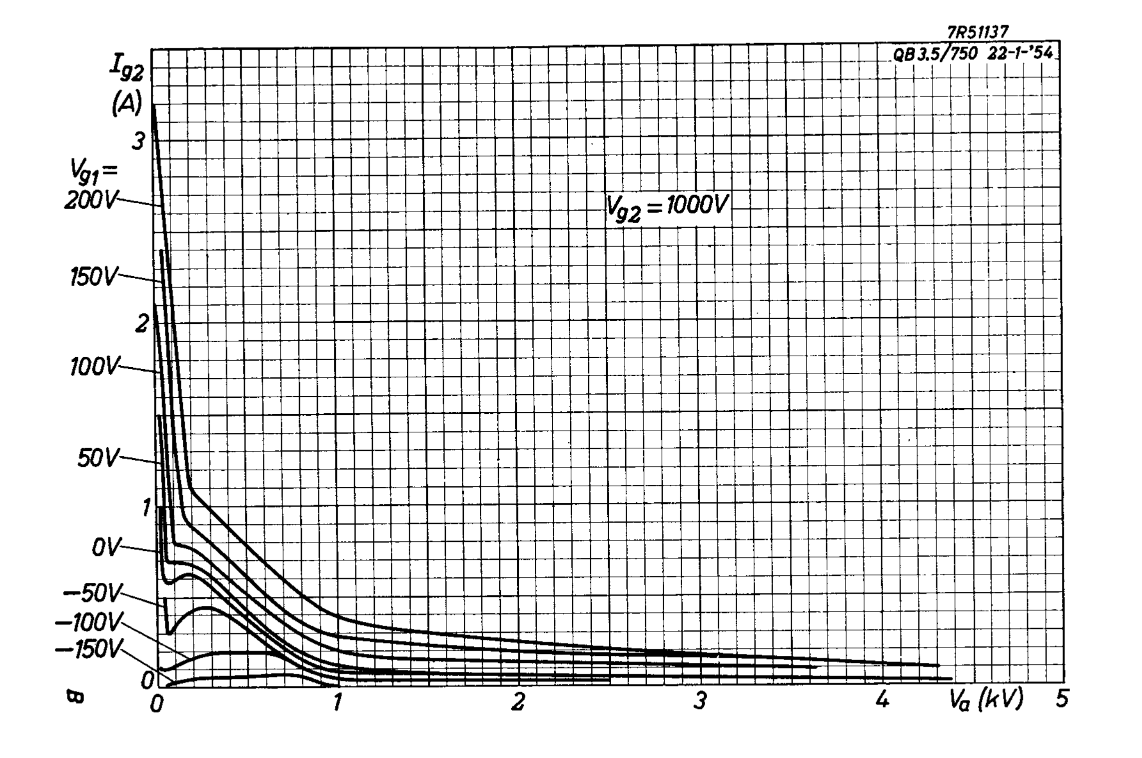
[1]) See page 6; voir page 6; siehe Seite 6

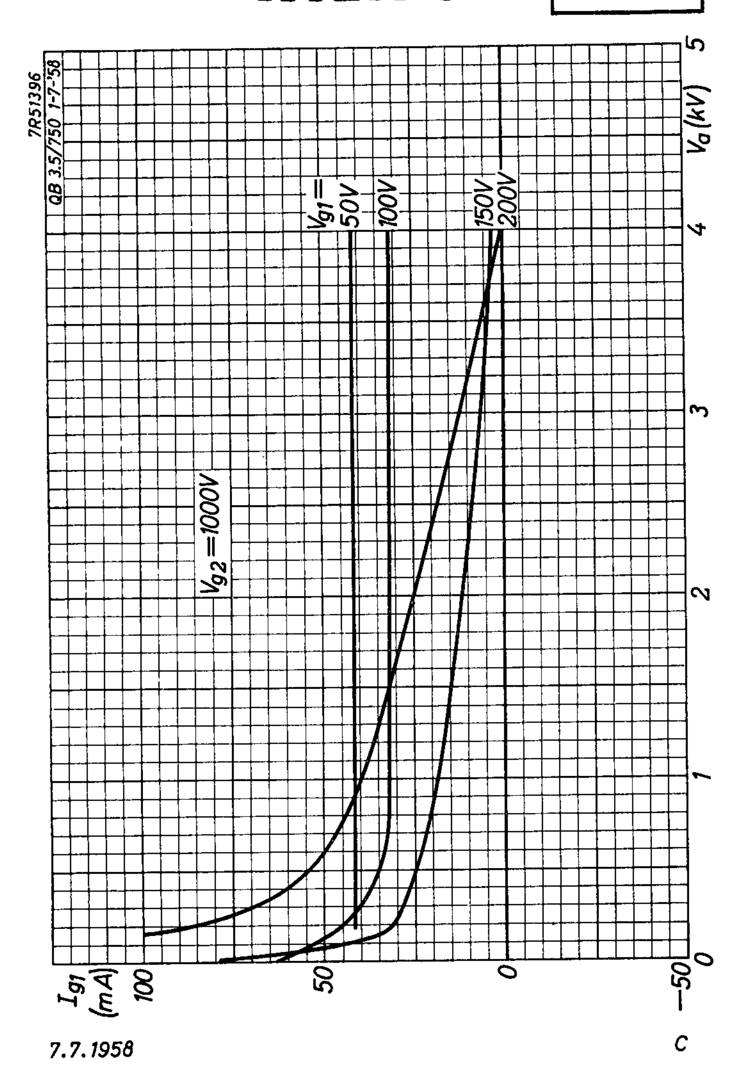
PHILIPS

QB 3.5/750



PHILIPS


7R51137
QB 3.5/750 22-1-'54
I_{g2} (A)
V_{g1} =
200V
150V
100V
50V
0V
−50V
−100V
−150V
V_{g2} = 1000V
0
1
2
3
0
1
2
3
4
V_a (kV)
5
B



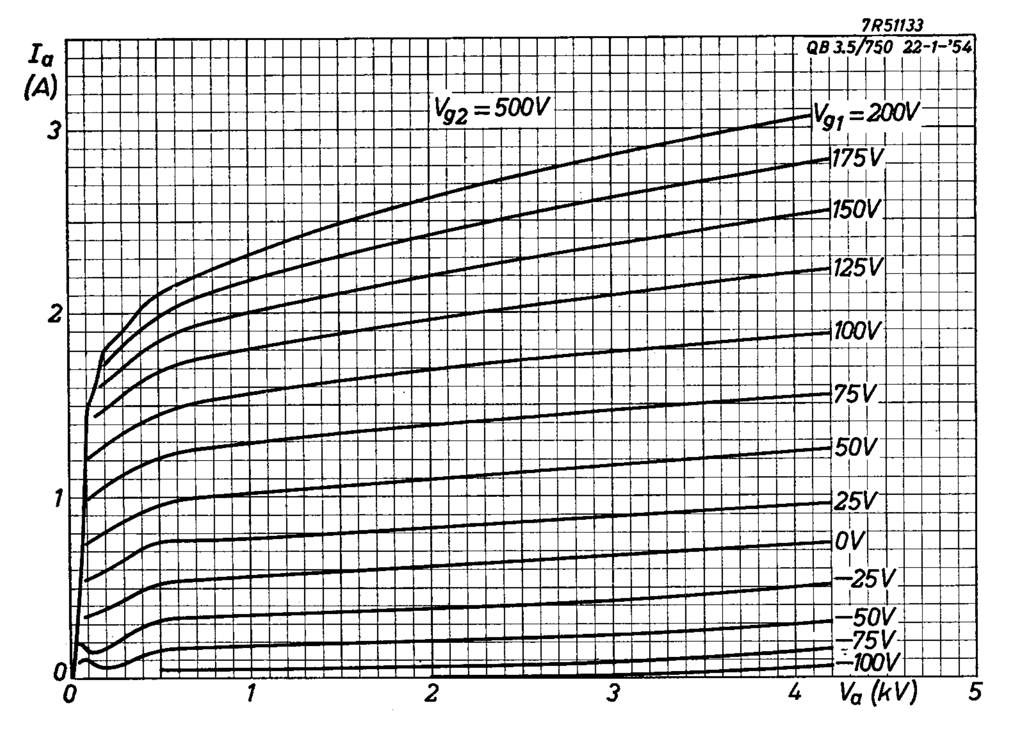
7R51396
QB 3.5/750 1-7-'58
V_{g1} =
50V
100V
150V
200V
V_{g2} = 1000V
V_a (kV)
0
1
2
3
4
5
I_{g1} (mA)
100
50
0
−50

7.7.1958

C

QB 3.5/750

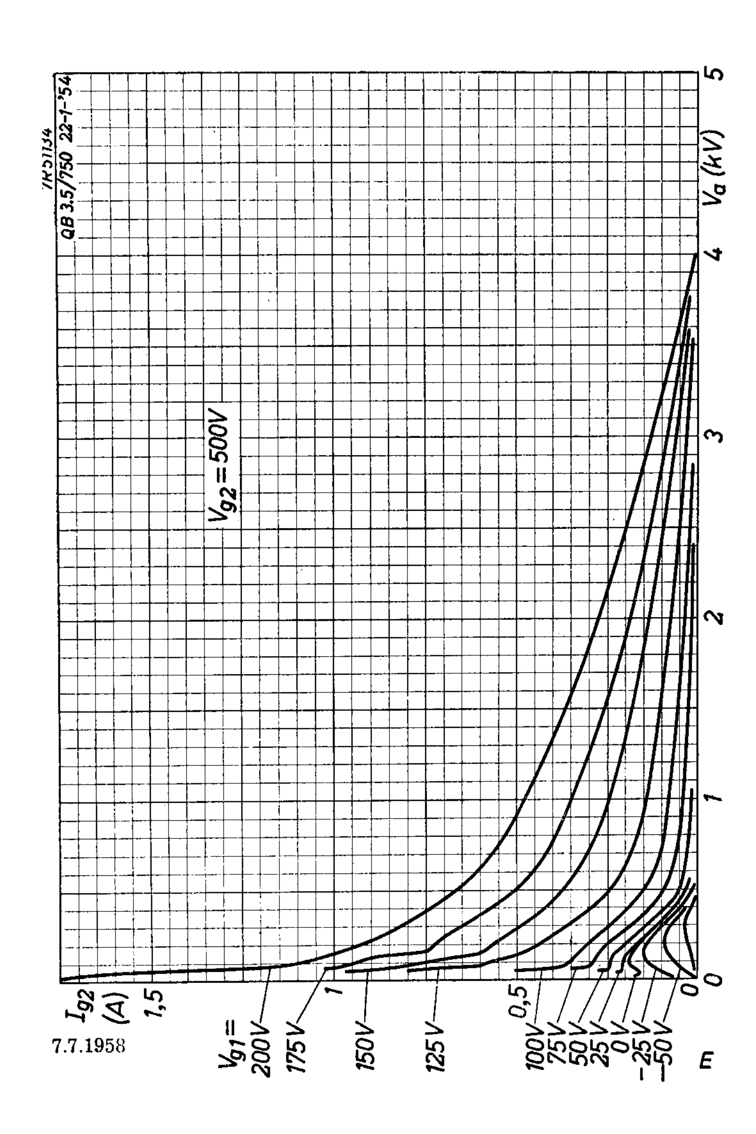
PHILIPS



D

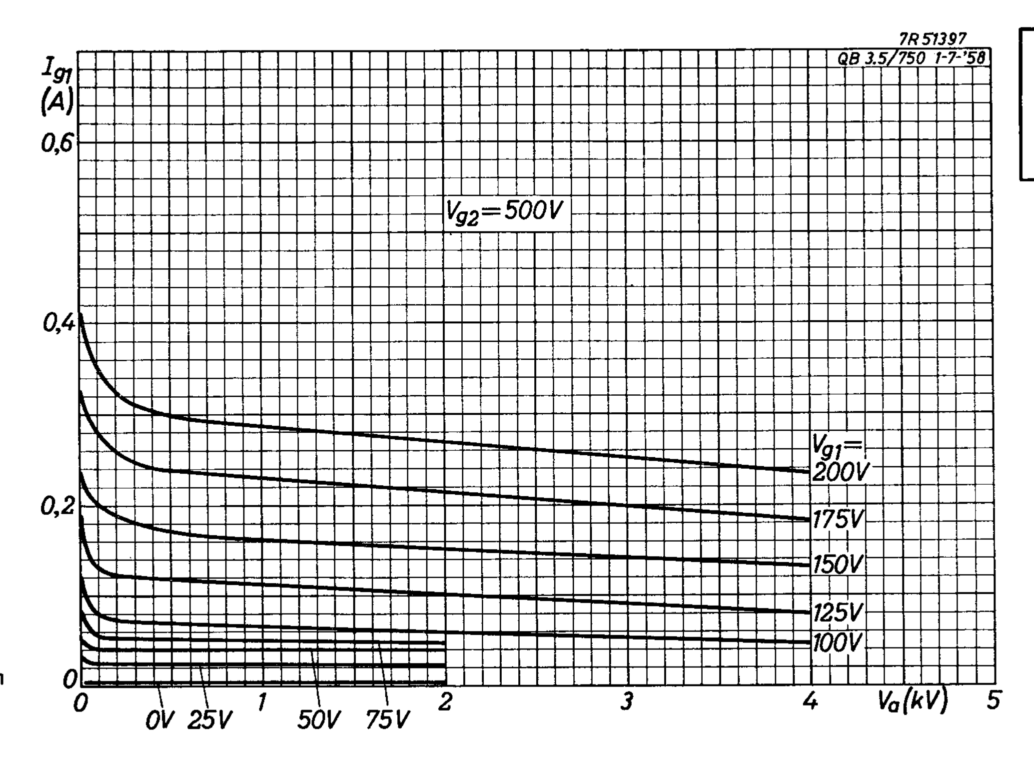
PHILIPS

QB 3.5/750

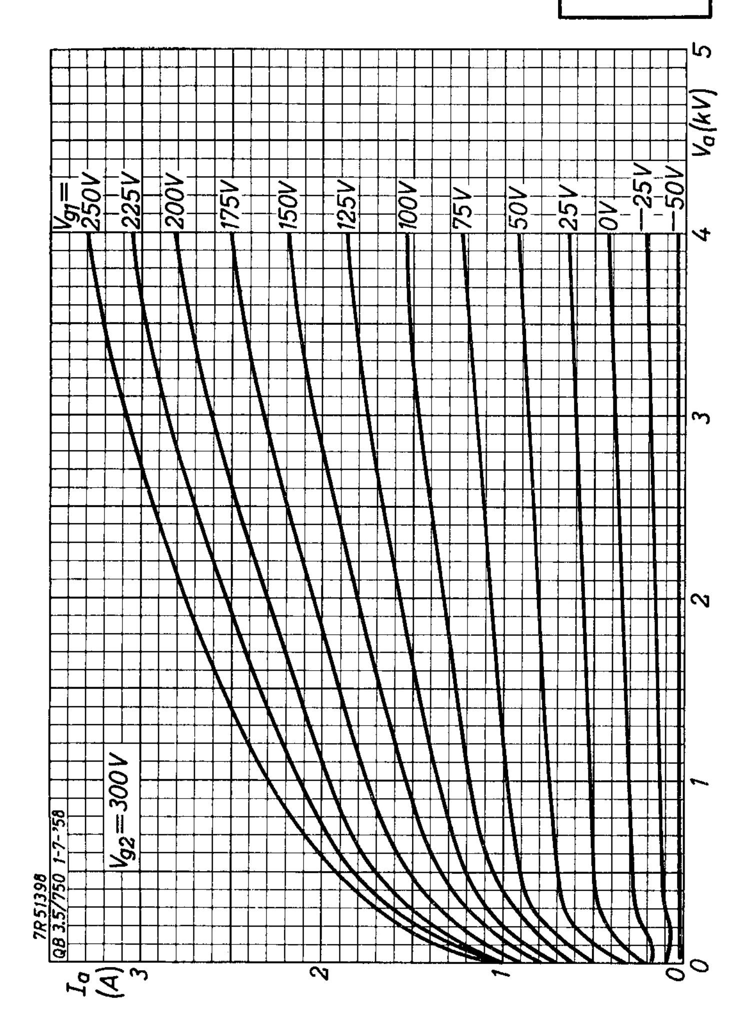


QB 3.5/750

PHILIPS

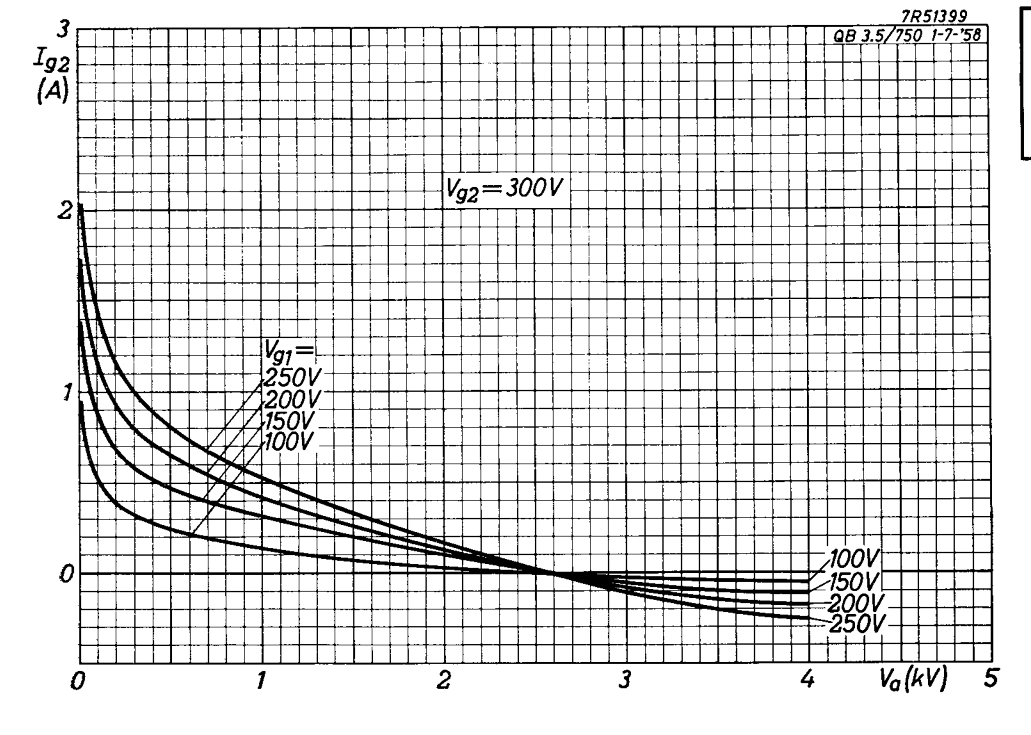


F


V_{g1}=
250V
225V
200V
175V
150V
125V
100V
75V
50V
25V
0V
−25V
−50V
V_a(kV)
0
1
2
3
4
5
I_a
(A)
3
2
1
0
V_{g2}=300V
7R51398
QB 3.5/750 1-7-'58

QB 3.5/750

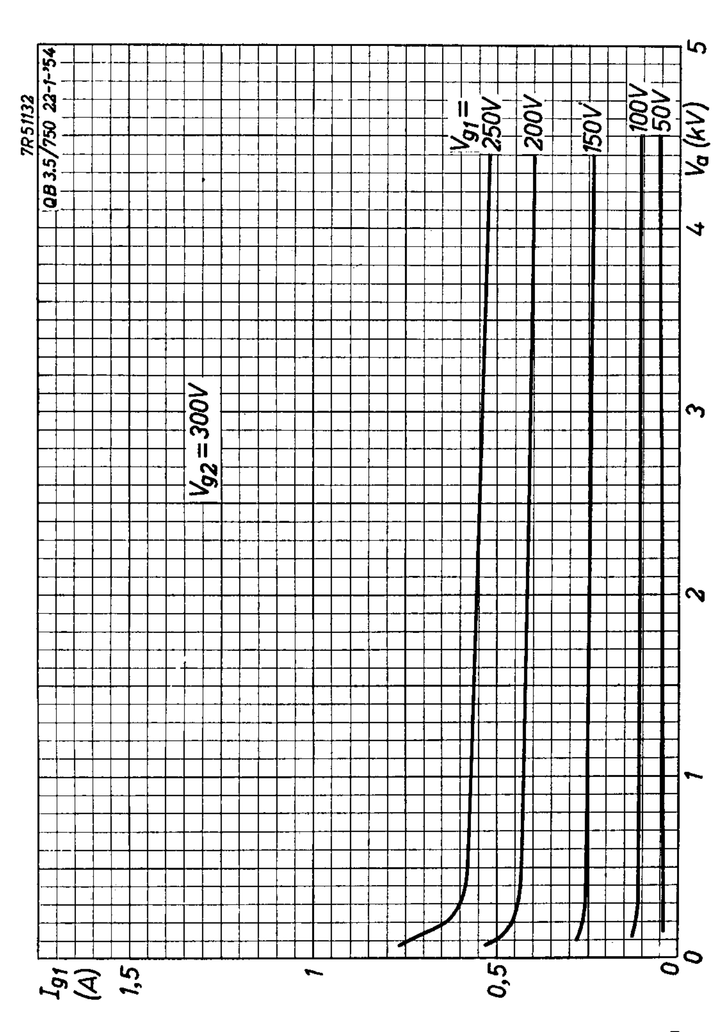
PHILIPS



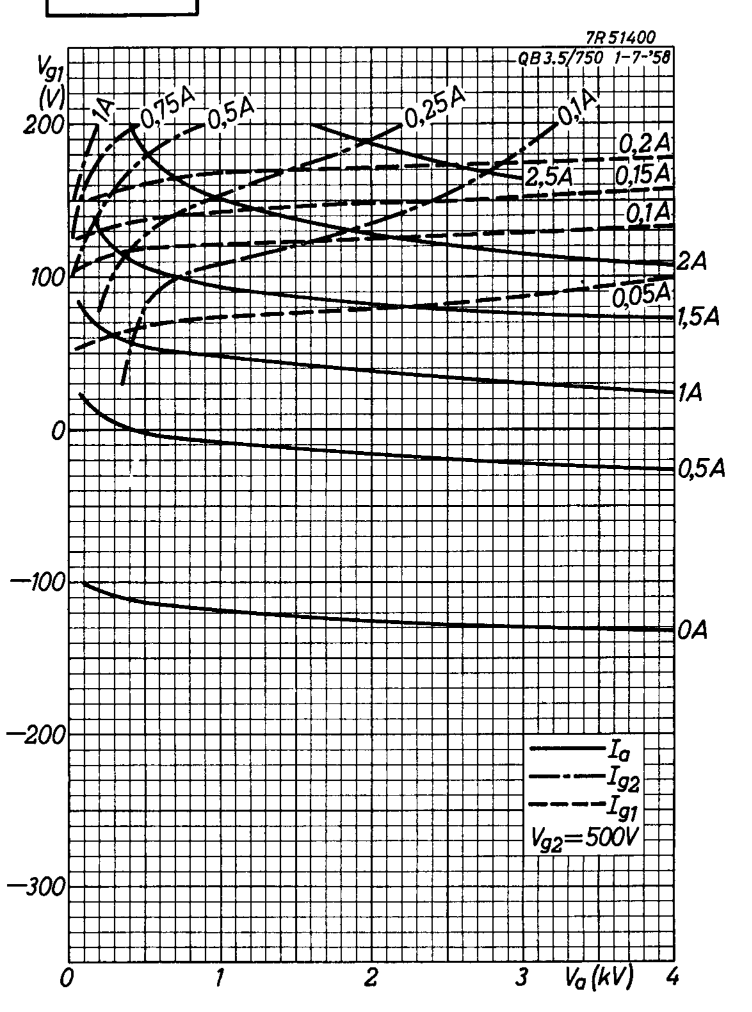
H

PHILIPS

QB 3.5/750

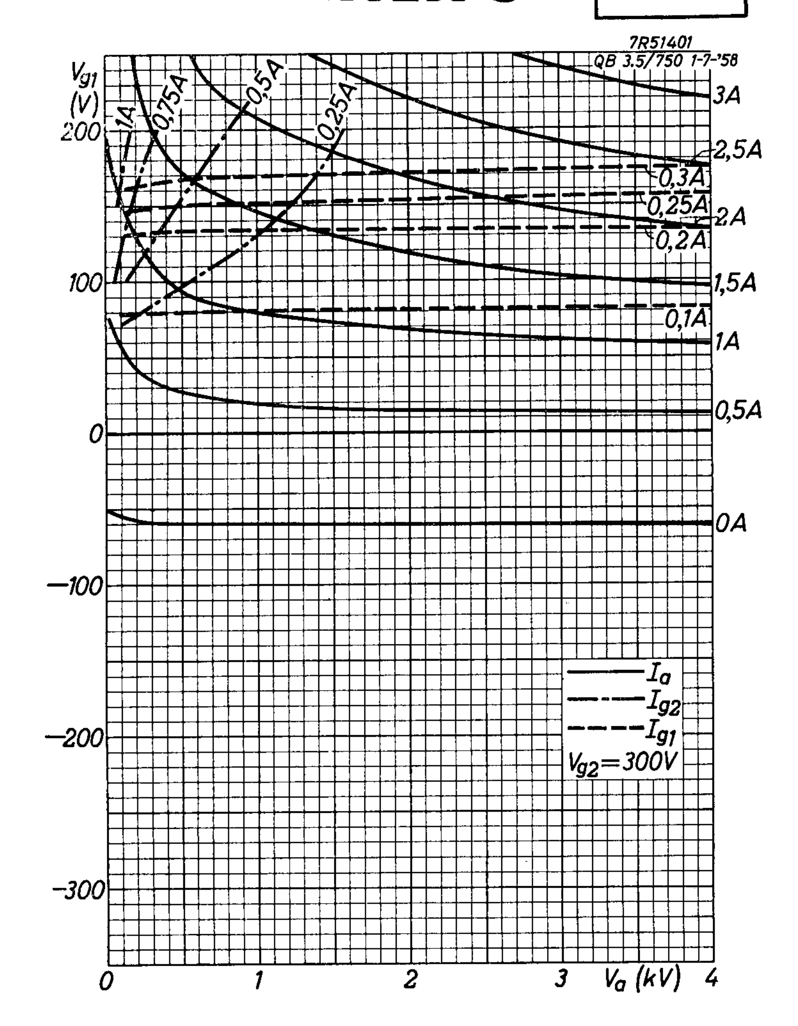


PHILIPS


7R 51400
QB 3.5/750 1-7-'58
V_{g1} (V)
200
100
0
−100
−200
−300
1A
0,75A
0,5A
0,25A
0,1A
0,2A
2,5A
0,15A
0,1A
2A
0,05A
1,5A
1A
0,5A
0A
I_a
I_{g2}
I_{g1}
V_{g2}=500V
0
1
2
3
V_a (kV)
4

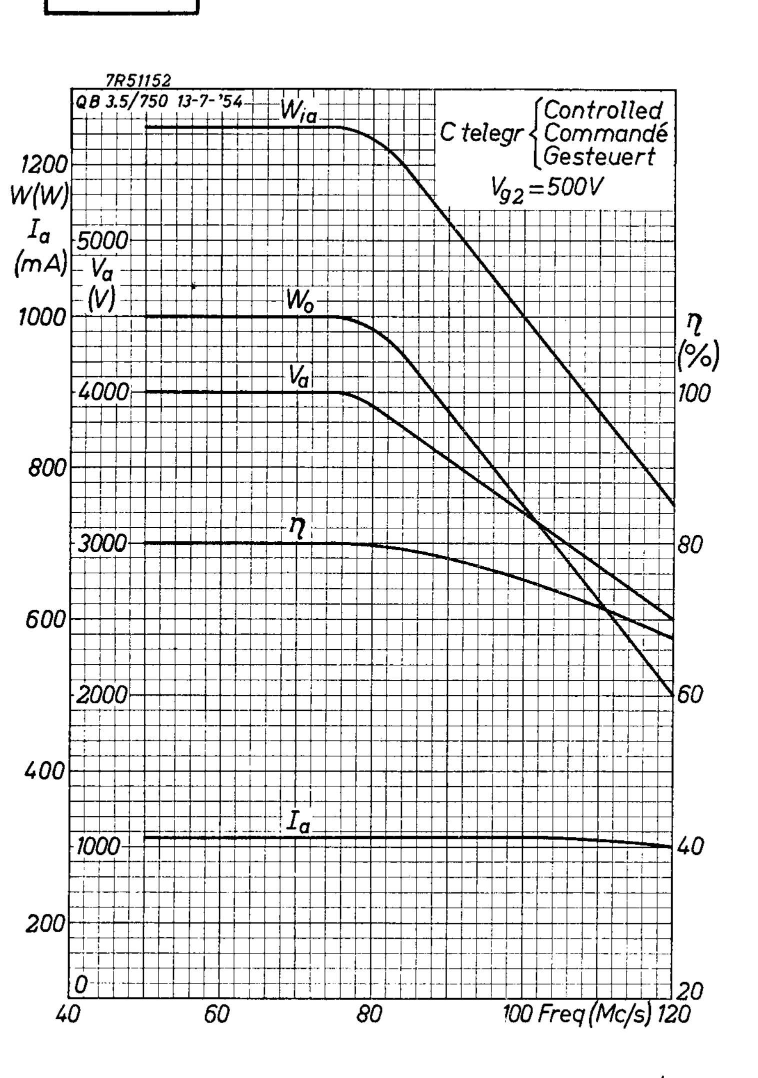
PHILIPS

QB 3.5/750



QB 3.5/750

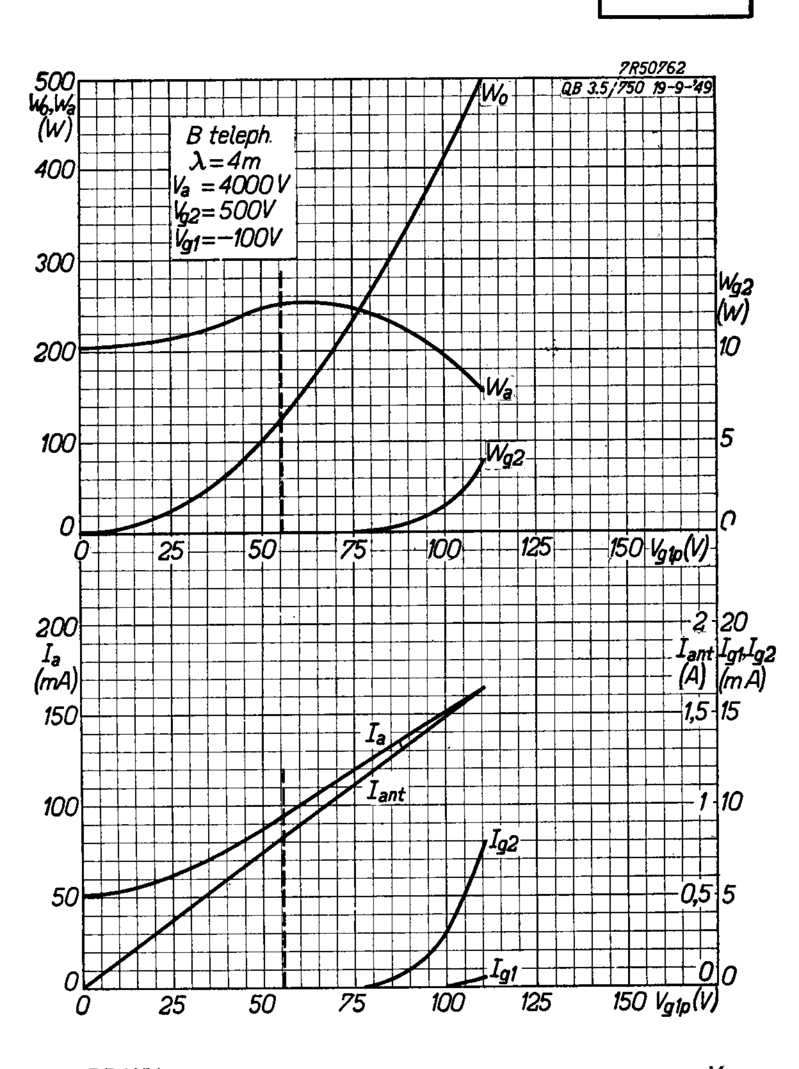
PHILIPS



L

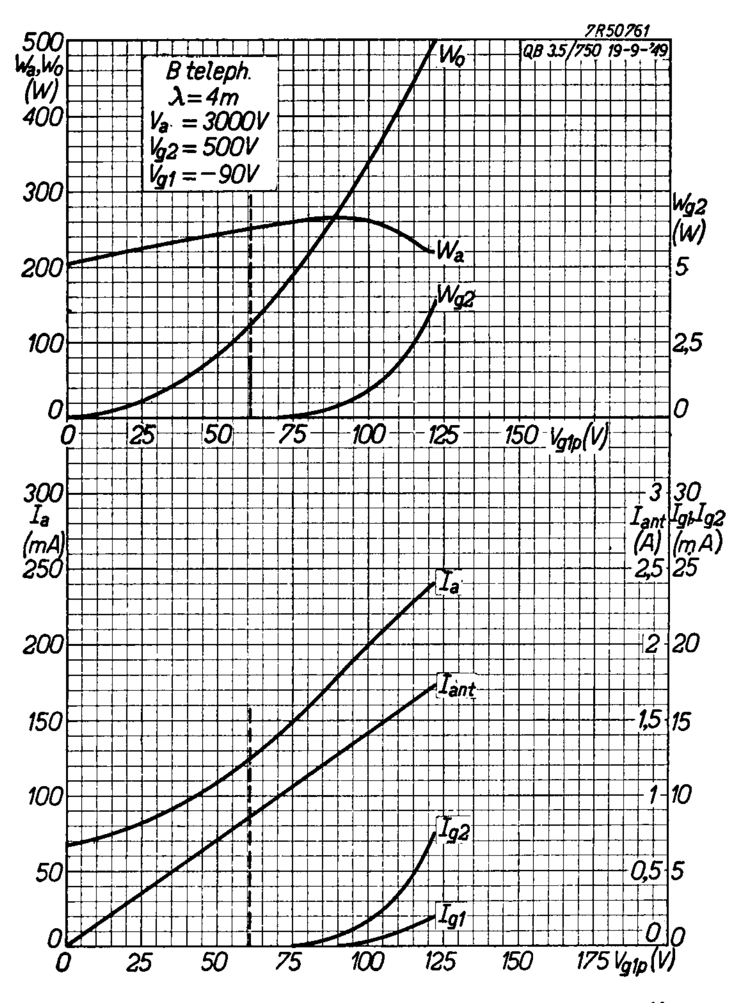
PHILIPS

QB 3.5/750

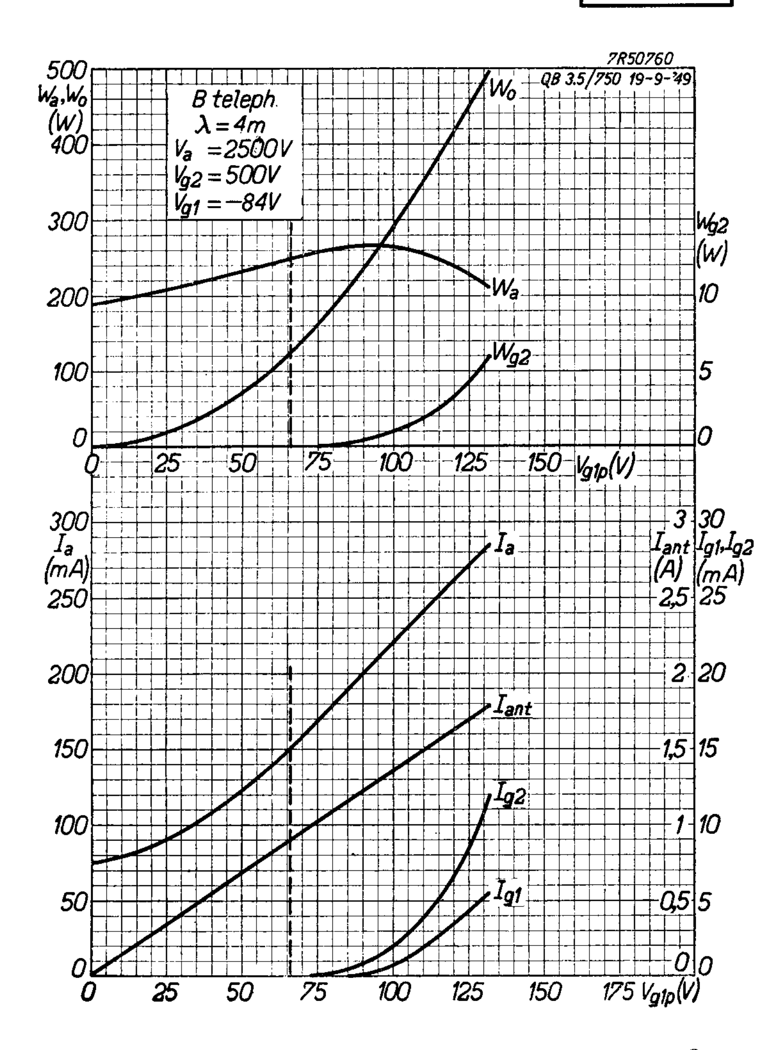


QB 3.5/750

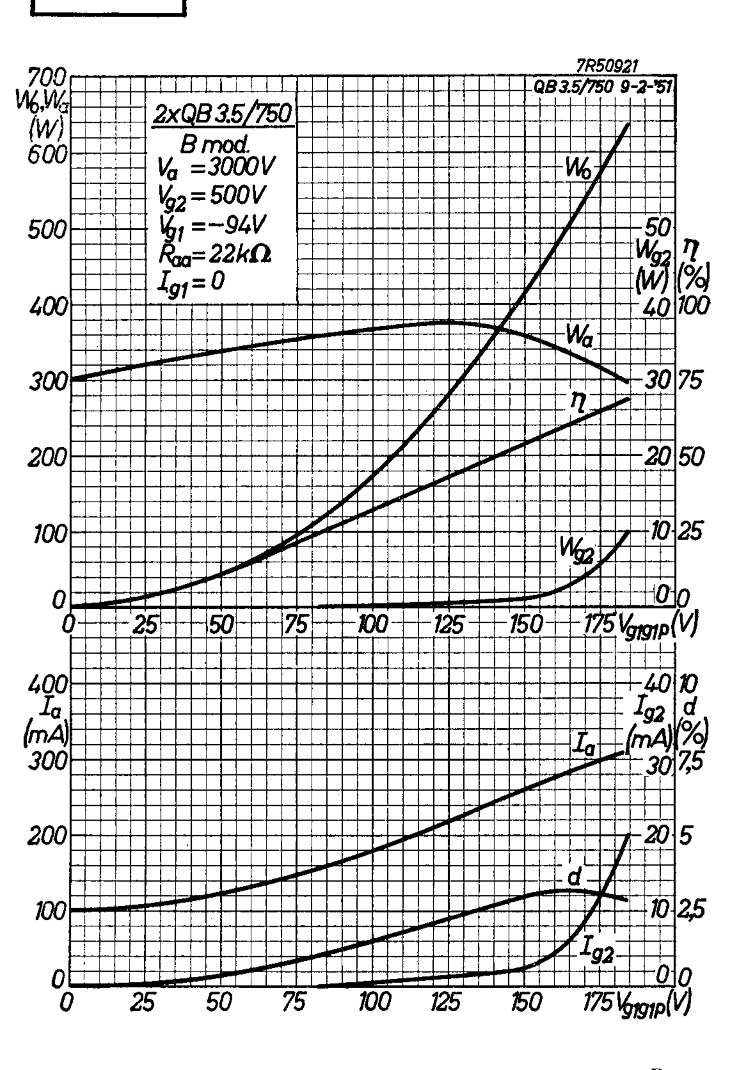
PHILIPS



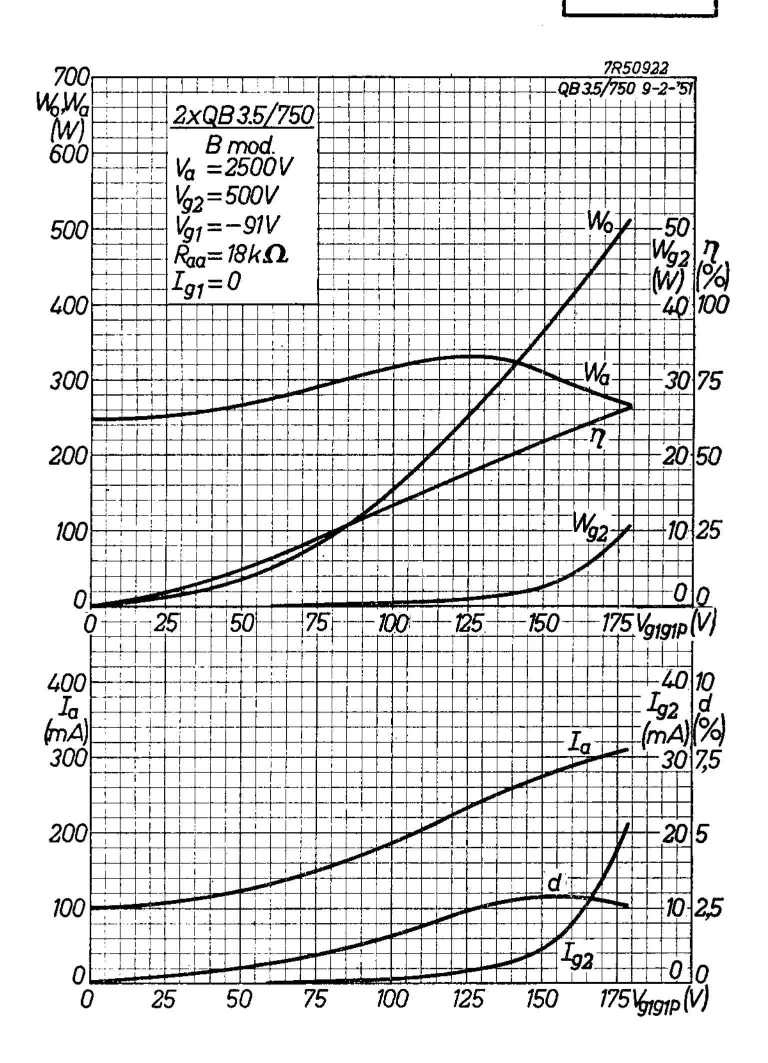
N


7R50760
QB 3.5/750 19-9-'49
B teleph.
λ = 4m
Va = 2500V
Vg2 = 500V
Vg1 = −84V
Wa,Wo (W)
Wo
Wa
Wg2
Wg2 (W)
Vg1p(V)
Ia (mA)
Ia
Iant
Ig2
Ig1
Iant (A)
Ig1,Ig2 (mA)
0
25
50
75
100
125
150
175
200
250
300
400
500

PHILIPS

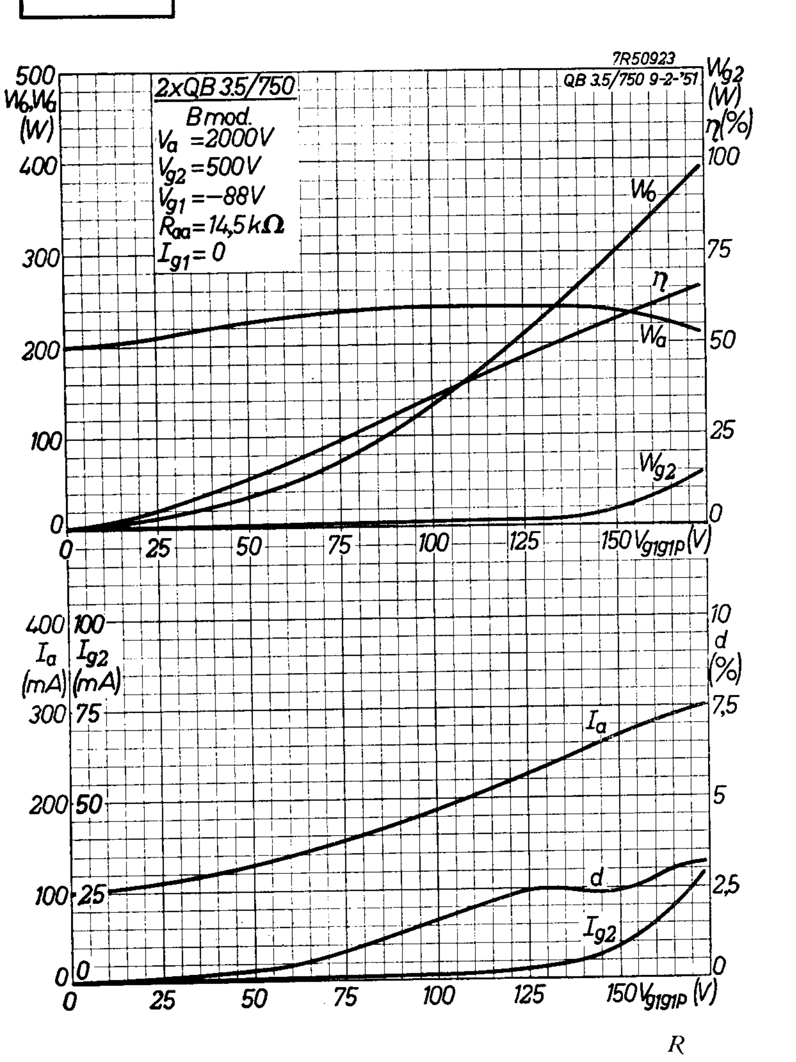

7R50921
QB 3.5/750 9-2-'51
2xQB 3.5/750
B mod.
Va = 3000V
Vg2 = 500V
Vg1 = -94V
Raa = 22kΩ
Ig1 = 0
Wo, Wa (W)
Wg2 (W)
η (%)
Wo
Wa
η
Wg2
Vg1g1p (V)
Ia (mA)
Ig2 (mA)
d (%)
Ia
d
Ig2

P


7R50922
QB 3.5/750 9-2-'51
2xQB 3.5/750
B mod.
V_a = 2500 V
V_{g2} = 500 V
V_{g1} = −91 V
R_{aa} = 18 kΩ
I_{g1} = 0
W_o, W_a (W)
W_o
W_a
η
W_{g2}
W_{g2} (W)
η (%)
V_{g1g1p} (V)
I_a (mA)
I_a
d
I_{g2}
I_{g2} (mA)
d (%)

QB 3.5/750

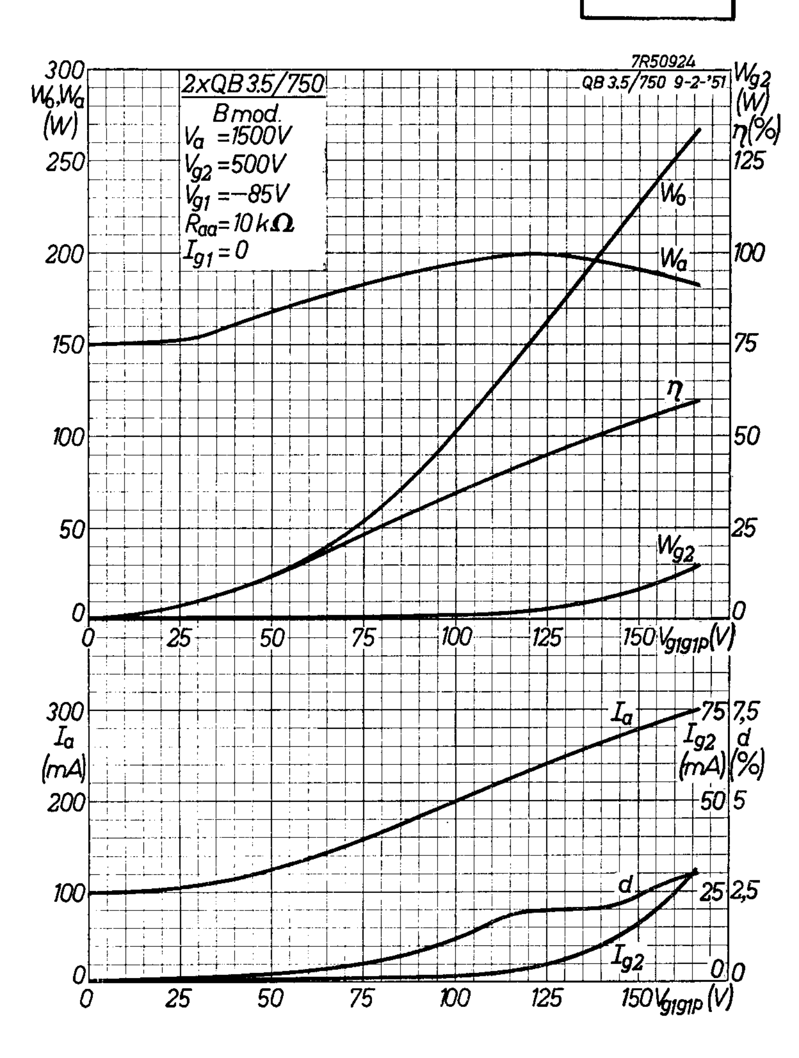
PHILIPS



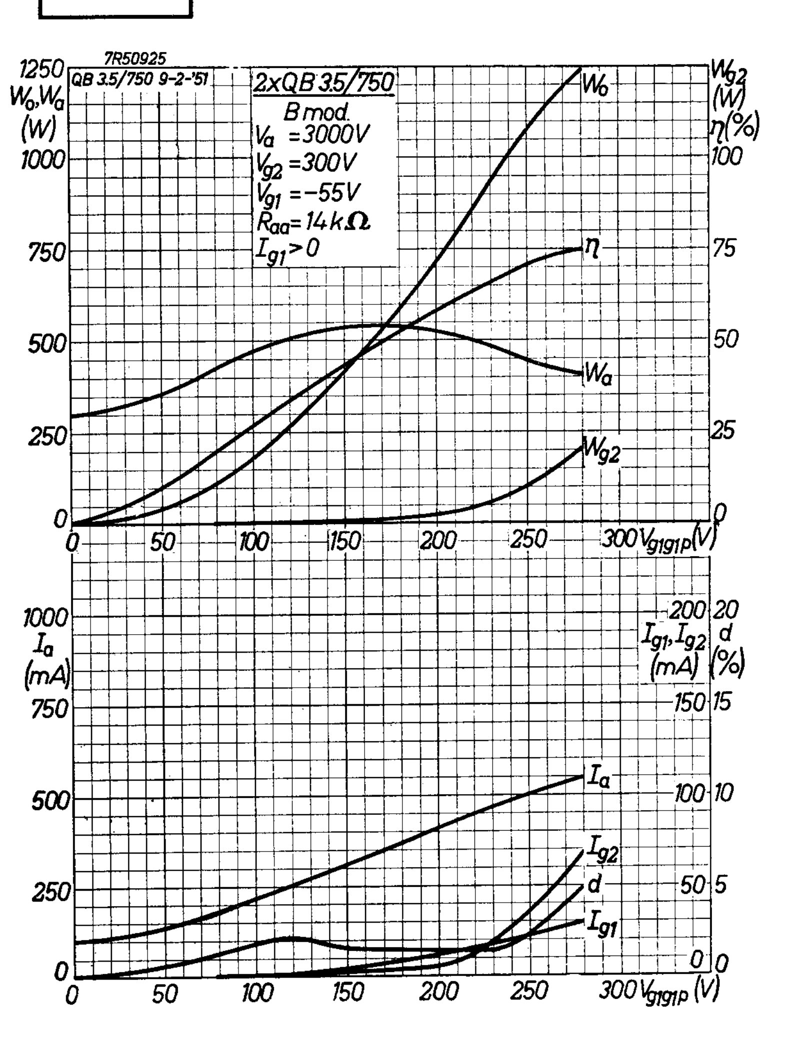
R

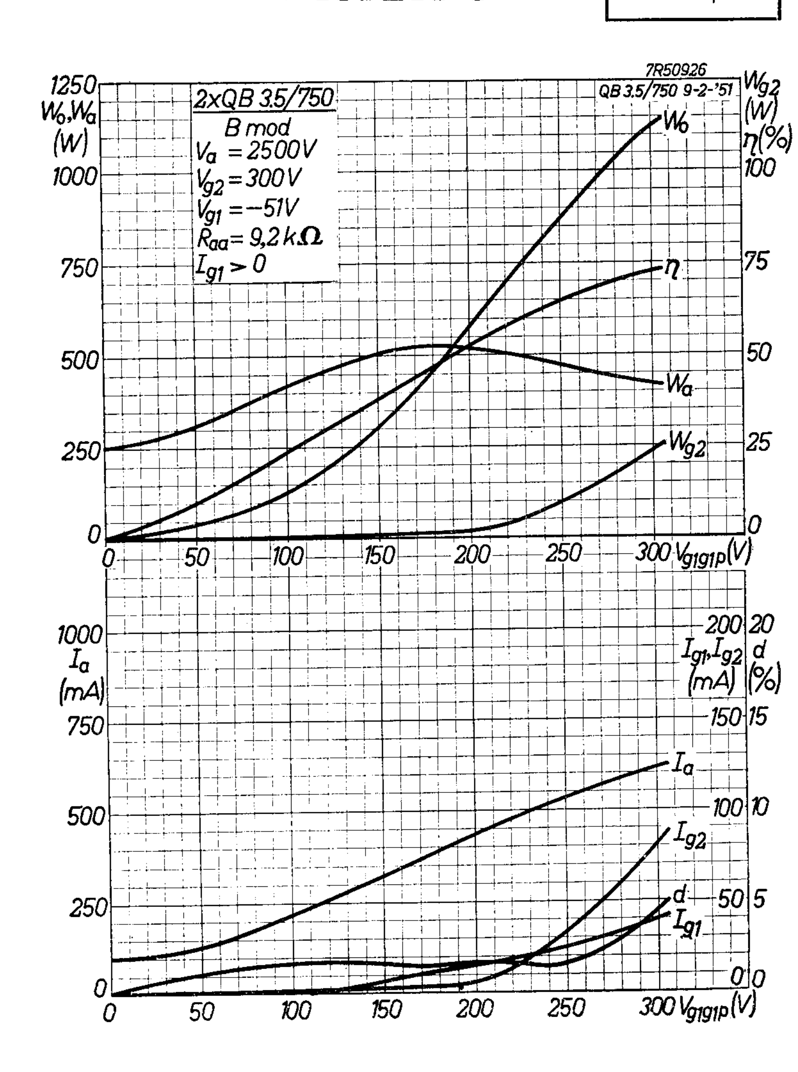
PHILIPS

QB 3.5/750

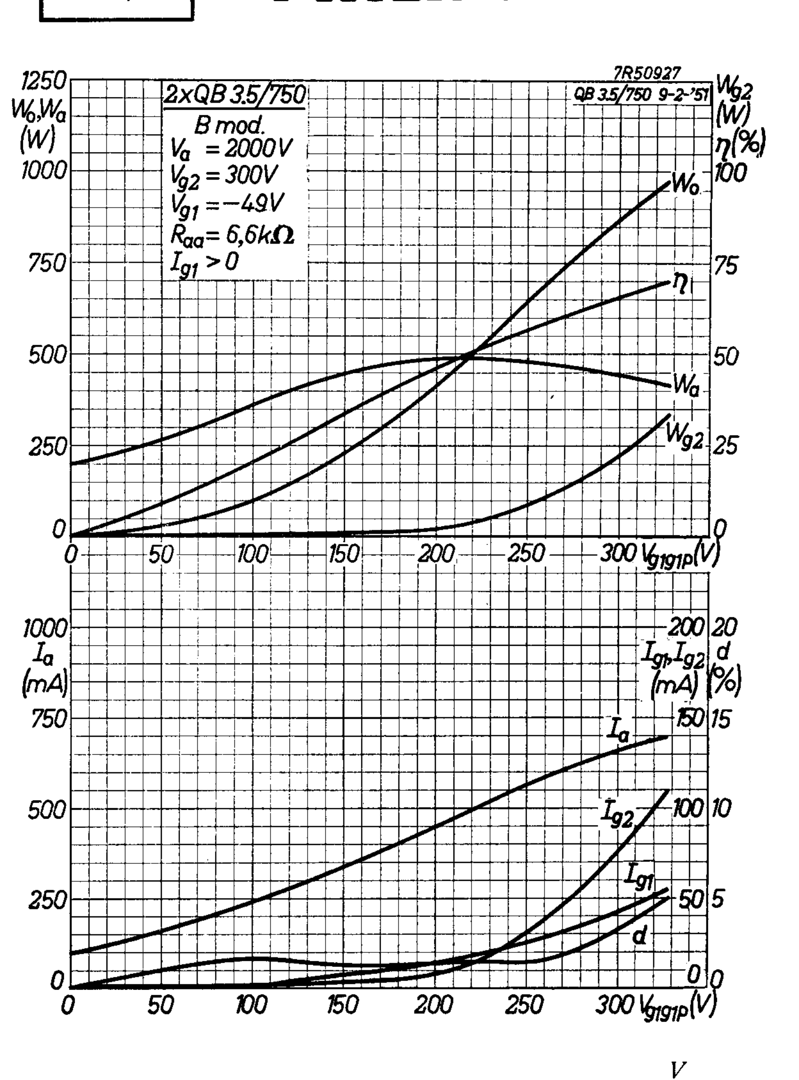


PHILIPS


7R50925
QB 3.5/750 9-2-'51
2xQB 3.5/750
B mod.
V_a =3000V
V_{g2} =300V
V_{g1} =−55V
R_{aa}= 14 kΩ
I_{g1}>0
1250
W_o,W_a
(W)
1000
750
500
250
0
W_{g2}
(W)
η(%)
100
75
50
25
0
W_o
η
W_a
W_{g2}
0
50
100
150
200
250
300 V_{g1g1p}(V)
1000
I_a
(mA)
750
500
250
0
200
I_{g1}, I_{g2}
(mA)
150
100
50
0
20
d
(%)
15
10
5
0
I_a
I_{g2}
d
I_{g1}


7R50926
QB 3.5/750 9-2-'51
2xQB 3.5/750
B mod
V_a = 2500 V
V_{g2} = 300 V
V_{g1} = −51 V
R_{aa} = 9,2 kΩ
I_{g1} > 0
W_o, W_a (W)
W_{g2} (W)
η(%)
W_o
η
W_a
W_{g2}
V_{g1g1p} (V)
I_a (mA)
I_{g1}, I_{g2} (mA)
d (%)
I_a
I_{g2}
d
I_{g1}

PHILIPS

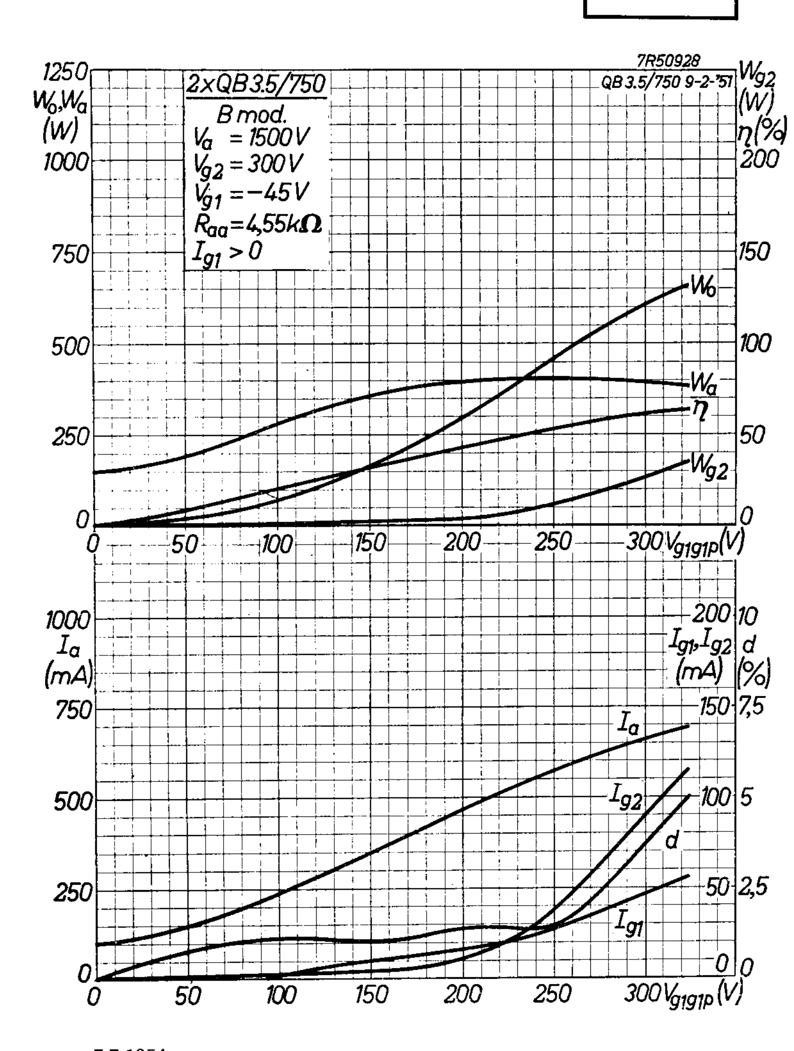


7R50927
QB 3.5/750 9-2-'51
2xQB 3.5/750
B mod.
V_a = 2000V
V_{g2} = 300V
V_{g1} = −49V
R_{aa} = 6,6kΩ
I_{g1} > 0
W_o,W_a (W)
W_{g2} (W)
η(%)
1250
1000
750
500
250
0
100
75
50
25
W_o
η
W_a
W_{g2}
0
50
100
150
200
250
300
V_{g1g1p}(V)
I_a (mA)
I_{g1},I_{g2} (mA)
d (%)
200
20
150
15
100
10
50
5
I_a
I_{g2}
I_{g1}
d

V

PHILIPS

QB 3.5/750





QB3.5/750

page	sheet	date
1	1	1954.07.07
2	2	1954.07.07
3	3	1954.07.07
4	3	1960.09.09
5	4	1954.07.07
6	4	1960.09.09
7	5	1954.07.07
8	6	1954.07.07
9	7	1957.03.03
10	8	1957.03.03
11	9	1956.01.01
12	A	1954.07.07
13	B	1954.07.07
14	C	1958.07.07
15	D	1958.07.07
16	E	1958.07.07
17	F	1958.07.07
18	G	1958.07.07
19	H	1958.07.07

20	I	1958.07.07
21	J	1958.07.07
22	K	1958.07.07
23	L	1958.07.07
24	M	1954.07.07
25	N	1954.07.07
26	O	1954.07.07
27	P	1954.07.07
28	Q	1954.07.07
29	R	1954.07.07
30	S	1954.07.07
31	T	1954.07.07
32	U	1954.07.07
33	V	1954.07.07
34	W	1954.07.07
35, 36	FP	2000.01.15